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Intellectual Property Office of New Zealand

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CERTIFICATE

#2

This certificate is issued in support of an application for Patent registration in a country outside New Zealand pursuant to the Patents Act 1953 and the Regulations thereunder.

I hereby certify that annexed is a true copy of the Provisional Specification as filed on 19 August 1999 with an application for Letters Patent number 337332 made by DEEP VIDEO IMAGING LTD.

Dated 5 September 2000.

Neville Harris

Neville Harris
Commissioner of Patents

PRIORITY DOCUMENT
SUBMITTED OR TRANSMITTED IN COMPLIANCE WITH RULE 17.1(a) OR (b)

337332

PATENTS FORM NO. 4

Appln Fee: $50.00

James & Wells Ref: 16453/3 BE

PATENTS ACT 1953

PROVISIONAL SPECIFICATION

VISUAL DISPLAY SYSTEM

I/WE Deep Video Imaging Limited, a New Zealand company of Airport Road, RD 2, Hamilton, New Zealand

do hereby declare this invention to be described in the following statement:

VISUAL DISPLAY SYSTEM

TECHNICAL FIELD

This invention relates to a visual display system.

BACKGROUND ART

Particularly, the present invention relates to a visual display system including multi-level screens which are placed physically apart.

Such screens are described in PCT Application Nos. PCT/NZ98/00098 and PCT/NZ99/00021.

These devices are created by combining multiple layers of selectively transparent screens. Each screen is capable of showing an image. In preferred embodiments the screen layers are liquid crystal display. Preferably the screens are aligned parallel to each other with a pre-set distance between them.

With this device images displayed on the screen furthest from view (background screen) will appear at some distance behind the images displayed on the screen closer to the viewer (foreground screen). The transparent portions in the foreground screen will allow viewers to see images displayed on the background screen.

This arrangement allowing multiple screens allows images to be presented at multiple levels giving the viewer true depth without use of glass or lens.

Up until now, software has been written to create visual sequences on the multi-level screens. These sequences have been mainly passive, mainly for viewing rather than for interaction.

While the visual effect of these sequences is spectacular, it will be desirable if potential uses of a multi-level screen display could be explored further.

It is an object of the present invention to address this problem, or at least to provide the public with a useful choice.

Aspects of the present invention will now be described by way of example only with reference to the following description.

DISCLOSURE OF INVENTION

According to one aspect of the present invention there is provided a visual display system including

multi-level screens spaced physically apart,

wherein each screen has a two-dimensional plane,

a visual indicator,

an input device,

a user selectable input,

the visual display system being characterised in that

the user can use the user selectable input to move the visual indicator via the input device out of the two-dimensional plane of a particular screen.

According to another aspect of the present invention there is provided a method of using a visual display system which has multi-level screens spaced physically apart,

wherein each screen has a two-dimensional plane,

the visual display system also including

a visual indicator,

an input device,

a user selectable input,

the method characterised by the step of

the user using the selectable input to move the visual indicator out of the two-dimensional plane of a particular screen.

In preferred embodiments of the present invention the multi-level screens are similar to that described in PCT Application Nos. PCT/NZ98/00098 and PCT/NZ99/00021, although this should not be seen as limiting.

The term two-dimensional plane refers to the effective viewing plane on a particular screen, similar to that seen on a normal display screen.

The visual indicator may be any type of indicator, for example a cursor, image, icon or screen image. It is envisaged that the visual indicator is something which can move in response to the user of the system via some input mechanism.

The input device may be any suitable input device, for example a mouse, data glove, keyboard, joystick, trackball, touch pad and so forth.

The user selectable input is preferably an input the user can make to effect the operation of software running the display device via the input device.

For example, if the input device is a mouse, then the user selectable input may be a mouse button. If the input device is a joystick, then the user selectable input may be the trigger. If the user input is a keyboard, then the user selectable input may be arrow keys. And so forth.

In some embodiments, the user selectable input may actually be a software button on a touch screen which may be independent of the input device. This allows standard input devices and drivers to be used without modification.

In further embodiments of the present invention, the input device shall be referred to as a mouse and the user selectable input shall be referred to as a mouse button. The mouse button may be an existing button on the mouse, or in some embodiments may be a dedicated button for use with the present invention.

This should not be seen as limiting.

The visual indicator shall now be referred to as a cursor, although this should not be seen as limiting.

The user can use a mouse to move a cursor around a display screen as can be achieved with usual software. However, with one embodiment of the present invention, the user can then click a particular mouse button to cause the visual indicator to move from one screen to another screen.

This ability enables the user to actually interact with different screens and work on separate screens in terms of having an input device which can interact with whichever screen has been selected. The advantages of this feature are self apparent.

In some embodiments, the movement from the two-dimensional plane of one screen to another screen may be discrete and it may appear that the visual indicator merely jumps from one screen to the other and be at the same x-y coordinate with the only change being in the z axis.

In other embodiments, there may be more of a linear movement perceived as a consequence of the movement from one screen to the other.

For example, the present invention may be used in conjunction with a drawing package. The person drawing may start drawing on the front screen of the visual device using the mouse and cursor.

The person then may wish to take advantage of the three dimensional quality allowed

by the present invention and effectively draw in the z axis (the x and y axis having already been drawn in on the two-dimensional screen). This may be achieved by the user clicking the mouse button and dragging the cursor effectively so it appears to pass from one screen to the other screen with an image (say a line) appearing to bridge between the front screen and another screen or screens in the background.

In other embodiments of the present invention this ability may be used with total screen images. For example, the present invention may be used with an interactive game which gives the impression that the user is moving deep within a scene. For example, the user may be flying a craft in the game and as the user moves forward in the game, the images may pass from the background screen or screens to the foreground screen giving the illusion of full movement.

Aspects of the present invention will now be described with reference to the following drawings which are given by way of example only.

BRIEF DESCRIPTION OF DRAWINGS

Further aspects of the present invention will become apparent from the following description which is given by way of example only and with reference to the accompanying drawings in which:

Figure 1 illustrates one embodiment of the present invention, and

Figure 2 illustrates a second embodiment of the present invention, and

Figure 3 illustrates a third embodiment of the present invention.

BEST MODES FOR CARRYING OUT THE INVENTION

Figures 1a and 1b illustrate a stylised version of one embodiment of the present invention at work. These figures have foreground screens 1 and background screens 2.

It should be appreciated that the reference to just two screens is by way of example only and the present invention may work in relation to multiple numbers of screens.

Figure 1a shows the positioning of the visual indicator 3 in the form of a cursor arrow on the front foreground screen 1.

In this embodiment of the present invention a simple click of a mouse button causes the cursor 3 to appear in exactly the same x y coordinates as on the foreground screen one, but, positioned on the background screen 2.

Thus in this embodiment, the user selectable input merely does a direct transpose in the z axis between screens.

Figure 2 likewise has a foreground screen 1 and a background screen 2. In Figure 2a, a triangle 4 has been drawn on the x y two-dimensional plane of the foreground screen 1.

In Figure 2b, to give the triangle 4 depth, the user has selected and dragged the image in the x y direction to give not only the image of a triangle 5 on the background screen 2, but also a plane in the z axis 6 for finding a solid-looking representation. As the screens are physically quite separate, the illusion of the solid wall 6 is accomplished by sophisticated software shading techniques.

Figure 3 again has a foreground screen 1 and background screen 2.

This embodiment of the present invention can be used for moving through three-dimensional landscapes. For example, in Figure 3a, there is pictured a flower 7 on the foreground screen, tree 8 along with a cloud 9 are positioned on the background screen 2.

The user may then use the input device to effectively move through the scene visually. This causes the flower depicted in Figure 3a to disappear from the foreground screen as shown in Figure 3b. This also causes the tree 8 to move from the background

screen 2 to the foreground screen 1. The cloud 9 being in the far background stays on the background screen 2.

Thus it can be seen that the present invention allows considerable amount of interaction between the user and the screens.

Aspects of the present invention have been described by way of example only and it should be appreciated that modifications and additions may be made thereto without departing from the scope thereof.

DEEP VIDEO IMAGING LIMITED

by their Attorneys

JAMES & WELLS

Fig. 1

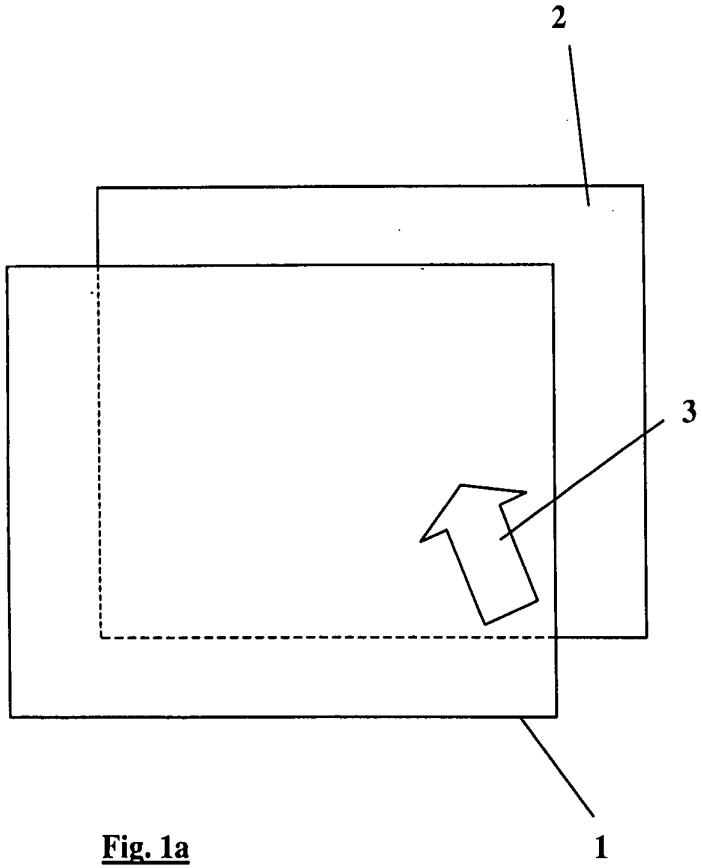

Fig. 1a

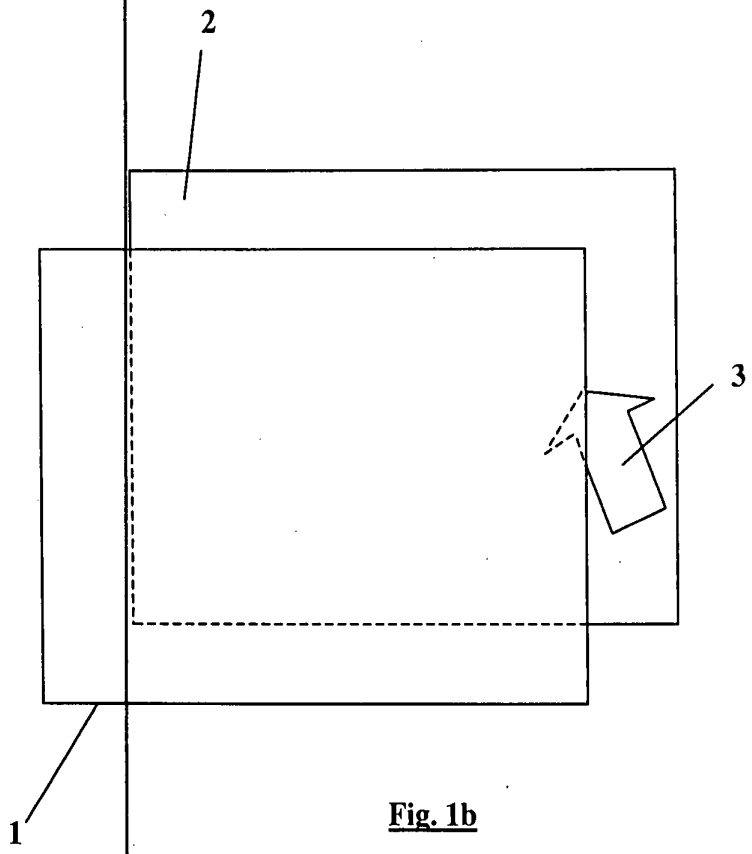

Fig. 1b

Fig. 2

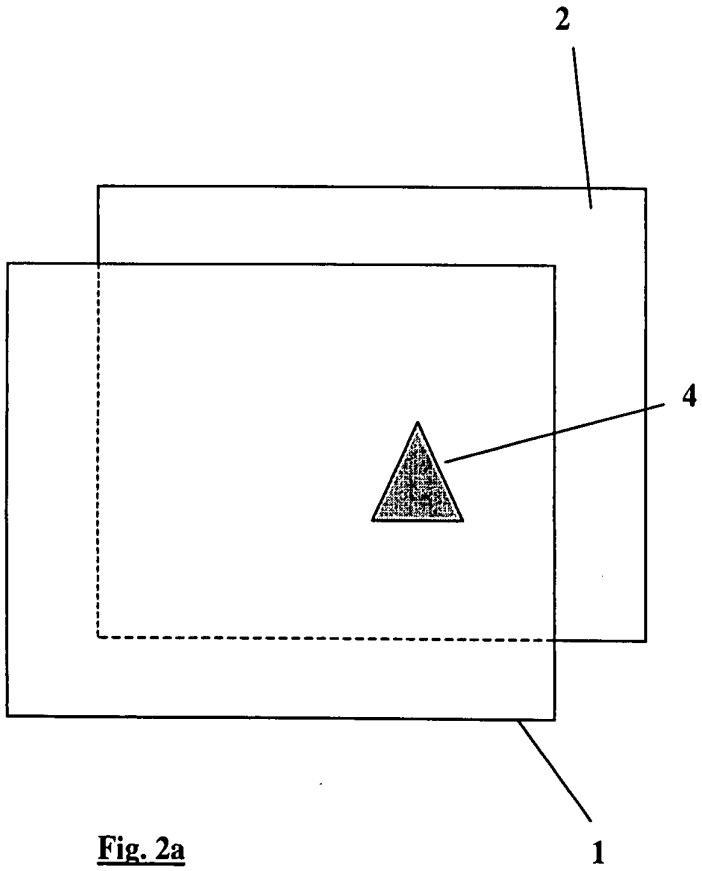

Fig. 2a

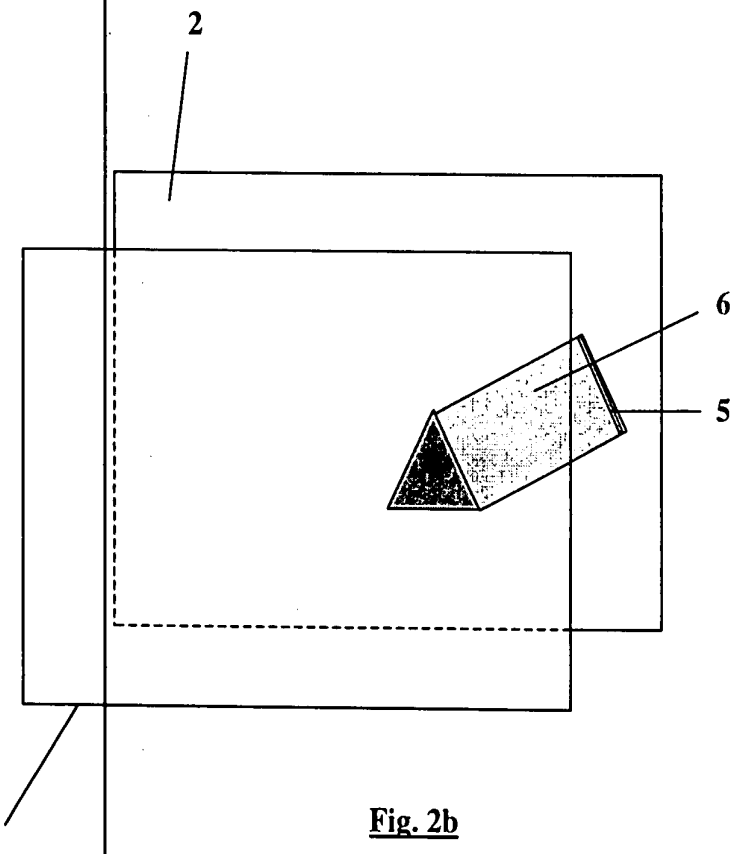

Fig. 2b

Fig. 3

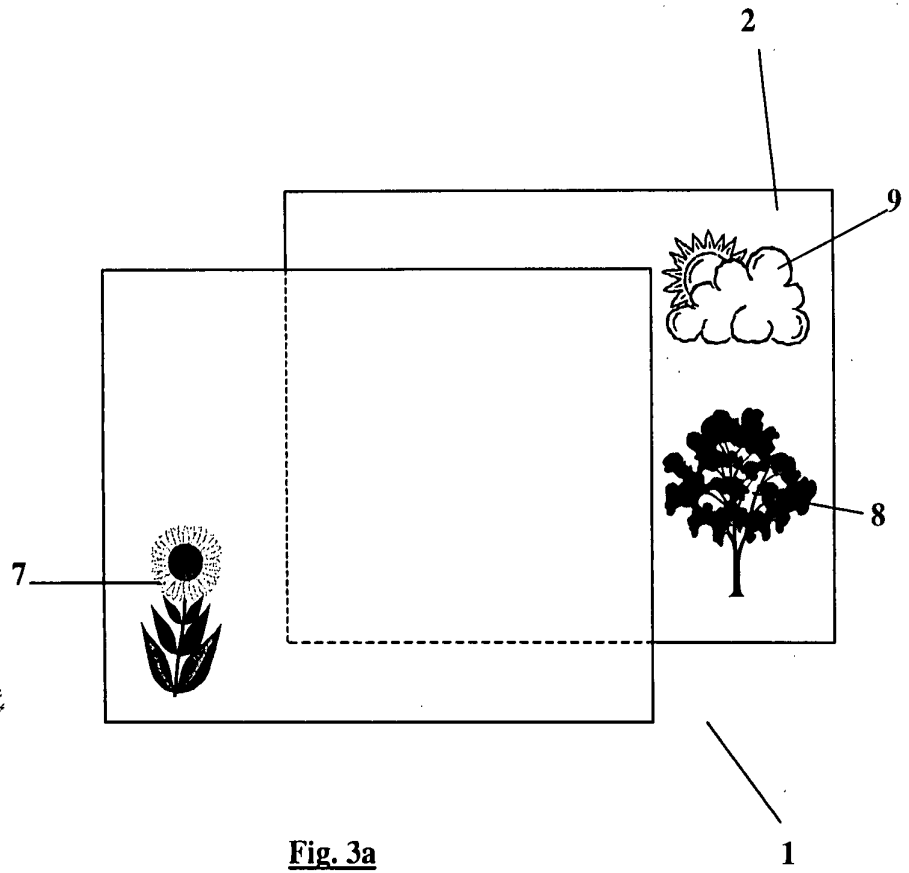

Fig. 3a

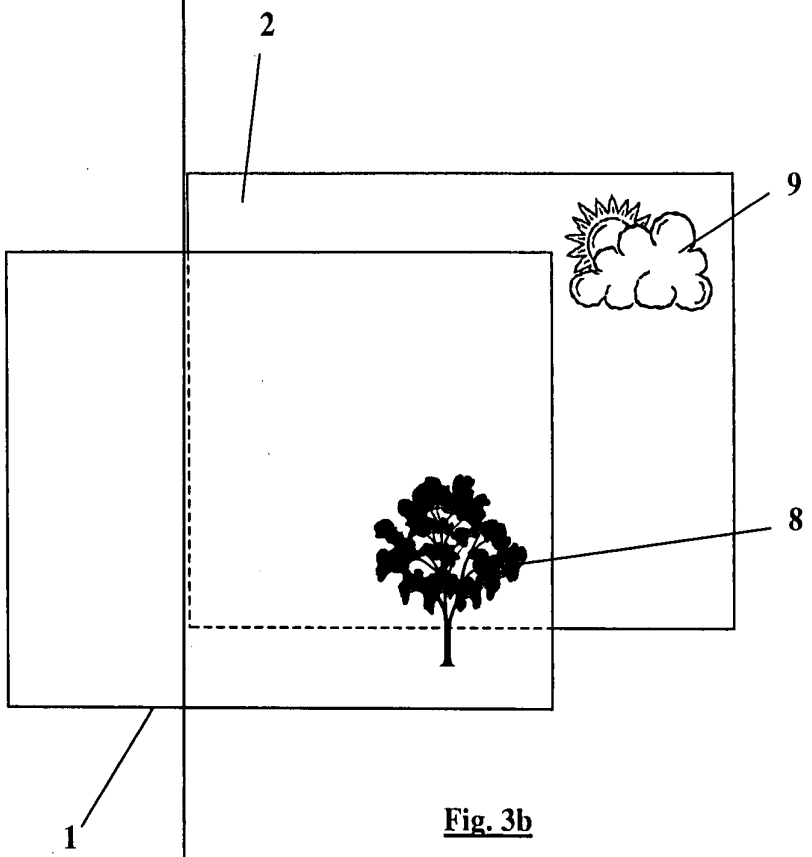

Fig. 3b